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Policy Brief

Revision of the Common International Classification for Ecosystem Services (CICES V5.1): A Policy Brief

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Abstract

The Common International Classification of Ecosystem Services (CICES) is widely used for mapping, ecosystem assessment, and natural capital ecosystem accounting. On the basis of the experience gained in using it since the first version was published in 2013, it has been updated for version 5.1. This policy brief summarises what has been done and how the classification can be used.

Keywords

CICES, ecosystem service classification, MAES, ESMERALDA, KIP-INCA

Introduction

It is often said that you cannot manage what you cannot measure. It follows, of course, that you also have to know precisely *what* is being measured. And this is where classification

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systems are important. They help us define what we mean and communicate what we have found.

The need for robust and relevant tools for classification is especially important in the field of ecosystem services (Polasky et al. 2015). To progress we have to bring together perspectives from different disciplines and ensure that we are talking about the same things. More fundamentally, to support evidence-based policy making, we must be able to review and transfer knowledge to different situations in ways that are clear and unambiguous. The *Common International Classification of Ecosystem Services*, CICES, has been developed to do just that.

CICES developed out of the work on environmental accounting undertaken by the European Environment Agency (EEA) and other international partners (Haines-Young and Potschin 2018). However, its application has gone far beyond accounting. It has been used as the basis of mapping and ecosystem assessment more generally. The work in the EU on Mapping and Assessment of Ecosystems and their Services (MAES)*1, for example, uses CICES as the framework for its work developing ecosystem service indicators (Czúcz et al. 2018).

The first fully operational version CICES (V4.3) was published in 2013. On the basis of the experience gained by the user community since then, its structure and scope has been reviewed, and a fully revised version (V5.1) is now available. This policy brief explains what has been done and why.

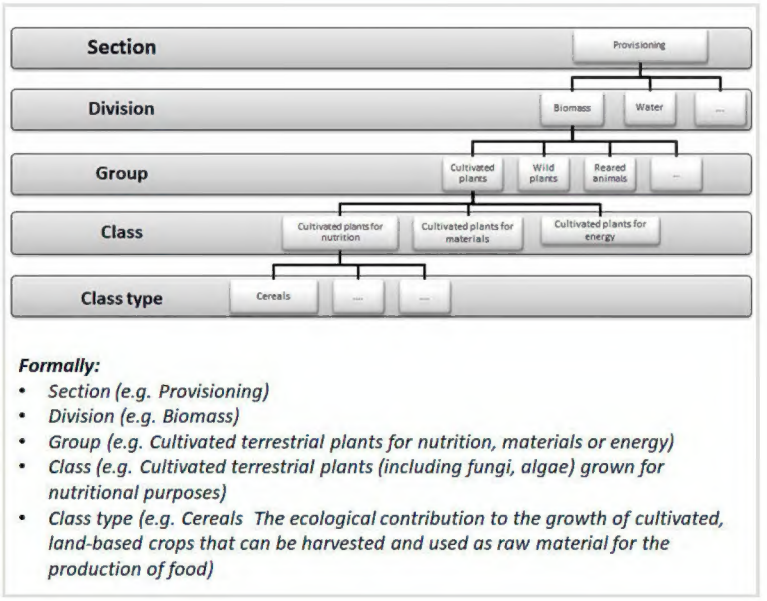
The structure and scope of CICES

Both the original and the new version of CICES defines ecosystem services as the contributions that ecosystems make to human well-being (Haines-Young and Potschin 2018). CICES focusses on the ‘final’ outputs of ecosystems and seeks to identify the materials and properties of ecological systems that can be used by people in beneficial ways.

CICES has been designed to capture the ways the science community has sought to describe ecosystem services, and following common usage, recognises that the main categories of ecosystem outputs to be provisioning, regulating and cultural services. To deal with the fact that people work at different spatial and thematic scales, CICES describes these service types by means of a five-level hierarchy, with each level is progressively more detailed and specific. However, the scope of the classificaiton is comprehensive, aiming to include all that can realistically be considered as an ecosystem service. The way it works can be seen in Fig. 1, which shows how ‘cereals’ might be classified.

Although the primary focus of CICES is on the way living systems (‘biodiversity’) give rise to these services, for completeness it also provides a way of classifying the abiotic

contributions that ecosystem can make. Fig. 2 and Fig. 3 provide an overview of the revised classification for the upper three levels.



Formally:

- *Section (e.g. Provisioning)*
- *Division (e.g. Biomass)*
- *Group (e.g. Cultivated terrestrial plants for nutrition, materials or energy)*
- *Class (e.g. Cultivated terrestrial plants (including fungi, algae) grown for nutritional purposes)*
- *Class type (e.g. Cereals The ecological contribution to the growth of cultivated, land-based crops that can be harvested and used as raw material for the production of food)*

Figure 1.

Illustration of the hierarchical structure of CICES V5.1 using cereals.

BIOTIC ecosystem outputs		
Section	Division	Group
Provisioning (Biotic)	Biomass	Cultivated terrestrial plants for nutrition, materials or energy
Provisioning (Biotic)	Biomass	Cultivated aquatic plants for nutrition, materials or energy
Provisioning (Biotic)	Biomass	Reared animals for nutrition, materials or energy
Provisioning (Biotic)	Biomass	Reared aquatic animals for nutrition, materials or energy
Provisioning (Biotic)	Biomass	Wild plants (terrestrial and aquatic) for nutrition, materials or energy
Provisioning (Biotic)	Biomass	Wild animals (terrestrial and aquatic) for nutrition, materials or energy
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from plants, algae or fungi
Provisioning (Biotic)	Genetic material from all biota (including seed, spore or gamete production)	Genetic material from animals
Provisioning (Biotic)	Other types of provisioning service from biotic sources	Other
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy
Provisioning (Abiotic)	Water	Other aqueous ecosystem outputs
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of wastes or toxic substances of anthropogenic origin by living processes
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Lifecycle maintenance, habitat and gene pool protection
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Pest and disease control
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Regulation of soil quality
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Water conditions
Regulation & Maintenance (Biotic)	Regulation of physical, chemical, biological conditions	Atmospheric composition and conditions
Regulation & Maintenance (Biotic)	Other types of regulation and maintenance service by living processes	Other
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Physical and experiential interactions with natural environment
Cultural (Biotic)	Direct, in-situ and outdoor interactions with living systems that depend on presence in the environmental setting	Intellectual and representative interactions with natural environment
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with natural environment
Cultural (Biotic)	Indirect, remote, often indoor interactions with living systems that do not require presence in the environmental setting	Other biotic characteristics that have a non-use value
Cultural (Biotic)	Other characteristics of living systems that have cultural significance	Other

Figure 2.

Overview of revised structure of CICES (V5.1) for biotic ecosystem services (upper three levels in the classification only).

ABIOTIC ecosystem outputs		
Section	**Division**	**Group**
Provisioning (Abiotic)	Water	Surface water used for nutrition, materials or energy
Provisioning (Abiotic)	Water	Ground water for used for nutrition, materials or energy
Provisioning (Abiotic)	Water	Other aqueous ecosystem outputs
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Mineral substances used for nutrition, materials or energy
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Non-mineral substances or ecosystem properties used for nutrition, materials or energy
Provisioning (Abiotic)	Non-aqueous natural abiotic ecosystem outputs	Other mineral or non-mineral substances or ecosystem properties used for nutrition, materials or energy
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of waste, toxics and other nuisances by non-living processes
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of nuisances of anthropogenic origin
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events
Regulation & Maintenance (Abiotic)	Regulation of physical, chemical, biological conditions	Maintenance of physical, chemical, abiotic conditions
Regulation & Maintenance (Abiotic)	Other type of regulation and maintenance service by abiotic processes	Other
Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting	Physical and experiential interactions with natural abiotic components of the environment
Cultural (Abiotic)	Direct, in-situ and outdoor interactions with natural physical systems that depend on presence in the environmental setting	Intellectual and representative interactions with abiotic components of the natural environment
Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting	Spiritual, symbolic and other interactions with the abiotic components of the natural environment
Cultural (Abiotic)	Indirect, remote, often indoor interactions with physical systems that do not require presence in the environmental setting	Other abiotic characteristics that have a non-use value
Cultural (Abiotic)	Other abiotic characteristics of nature that have cultural significance	Other

Figure 3.

Overview of revised structure of CICES (V5.1) for abiotic ecosystem services (upper three levels in the classification only).

What's new?

The revised version of CICES (V5.1) was released in January 2018. The update was based on a wide-ranging consultation with the user community and a review of published work (Haines-Young and Potschin 2018). The revision basically clarifies the way specific ecosystem services are defined and extends the scope of the classification. In particular the structure has been modified to help people aggregate service categories more easily for reporting purposes when no-end use is known.

The need to be clear about the distinction between ecosystem services and their associated benefits was one of the key tasks identified by the user community that was tackled in the revision of CICES (Haines-Young and Potschin 2018). To emphasise the 'purposeful' nature of ecosystem service, in V5.1 the definition of each service is therefore made up of two parts, one describing the biophysical output from the ecosystem (i.e. *what the ecosystem does*) and the other describing the contribution it makes some benefit (i.e. how that output is used or enjoyed by people).

So, for example, the service 'Wild animals (terrestrial and aquatic) for used nutrition' would be now be defined using this two part approach as 'non-domesticated, wild animal species and their outputs ….. that can be harvested and used as a raw material for the production of food'. Similarly, the service of 'pest control' would be 'the reduction by biological

interactions of the incidence of species…… that damage or reduce the output of food, material or energy from ecosystems, or their cultural importance, by the consumption of biomass or the spreading of disease'.

These formal definitions are important, so we can be clear about what we are measuring and managing. However, to help people cope with the complexity of the field of ecosystem services the revised classification provides some simpler names to refer to services that can be used in public consultation, and examples of services and benefits for each category so that people can understand better what is being discussed. The service categories are also coded numerically to assist referencing and analysis.

What next?

Despite the changes that have been made in the revised version of CICES it is fully compatible with the original and there is detailed documentation on what has been done. In making the revision it was also recognised that people may use other ways of naming ecosystem services in their work, and so to develop CICES as a reference system we have also provided cross-references to the typologies used in the Millennium Assessment (MA), The Economics of Ecosystems and Biodiversity (TEEB), and IPBES, with its concept of nature's benefits to people*2. The important thing now is to use the new version and develop further our understandings of how ecosystems can benefit people.

CICES is one of the tools that can help us measure ecosystem services better. Future work will need to look at how this classification can link to the ways we classify and characterise the condition of ecosystems, so that we can understand the biophysical underpinnings of ecosystem services. It will also need to look at the way we describe and classify benefits and beneficiaries, so that we can better document how people depend on or engage with nature over space and time. Some of this work has begun in EU-funded projects such as OpenNESS and ESMERALDA, and further insights will emerge from the wider use of the classification in the other work in the EU on natural capital and ecosystem services accounting*3. We need to measure the value of ecosystems and the cost of their depletion in clear and unambiguous ways if we are to inform policy and investment decisions. CICES is one tool that can help us in this important task.

How do I find out more?

The CICES website (www.cices.eu) provides access to the revised classification tables and the guidance document that explains the revision in detail. It also provides links to current applications and publications, and how you can reference work based on CICES V5.1. Further discussion on the issues of classifying ecosystem services can be found in Potschin and Haines-Young (2016).

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References

- Czúcz B, Arany I, Potschin-Young M, Bereczki K, Kertész M, Kiss M, Aszalós R, Haines-Young R (2018) Where concepts meet the real world: A systematic review of ecosystem service indicators and their classification using CICES. Ecosystem Services 29: 145-157. https://doi.org/10.1016/j.ecoser.2017.11.018
- Haines-Young RH, Potschin MB (2018) Common International Classification of Ecosystem Services (CICES) V5.1 and Guidance on the Application of the Revised Structure. Fabis Consulting Ltd [In English]. URL: https://cices.eu/content/uploads/sites/8/2018/01/Guidance-V51-01012018.pdf
- Polasky S, Tallis H, Reyers B (2015) Setting the bar: Standards for ecosystem services. Proceedings of the National Academy of Sciences 112 (24): 7356-7361. https://doi.org/10.1073/pnas.1406490112
- Potschin M, Haines-Young R (2016) Defining and measuring ecosystem services. In: Potschin M, Haines-Young R, Fish R, Turner RK (Eds) Routledge Handbook of Ecosystem Services. Routledge, London and New York, 25-42 pp. URL: http://www.routledge.com/books/details/9781138025080/ [ISBN 978-138-02508-0].

Endnotes

*1 http://biodiversity.europa.eu/maes

*2 https://www.ipbes.net/system/tdf/downloads/pdf/ipbes-5-inf-24.pdf?file=1&type=node&id=534

*3 https://www.eea.europa.eu/soer-2015/europe/natural-capital-and-ecosystem-services